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GEOLOGY AND PALÆONTOLOGY.

LYDEKKER ON EXTINCT MAMMALIA OF INDIA.¹—The noble volume below named, concludes the first part of the work of Dr. Lydekker on the Fossil Mammalia of India. It covers a part of the subject which was left very incomplete by Cautley and Falconer, and includes much new matter. It adds materially to our knowledge of the Mustelidæ, Ursidæ, Canidæ, Viverridæ, Felidæ, and Hyænidæ. Dr. Lydekker shows that India, in the late Miocene period, was the headquarters of the genus *Hyæna*, there being no less than five species represented in the collection. Of Ursidæ there are five species, viz., two of *Ursus* and three of *Hyænarctus*, of which one *Ursus* and two *Hyænarcti* are new. The latter genus receives thorough treatment, and Dr. Lydekker has added greatly to our knowledge of its characters. There are four species of Canidæ and nine of Felidæ. Of the latter, two species are sabre teeth. Two species of *Mellivora* and one of *Mellivorodon* (gen. nov.) represent the Mustelidæ.

The descriptions of the species are thorough, and the plates are excellent. Dr. Lydekker exercises a healthy conservatism in the matter of species, and a rather greater degree of the same trait in dealing with genera. He is disposed to drop generic divisions whose characters are not of the highest degree of importance. To this course we object, that if we begin to neglect anatomical characters, we end in a disuse of all genera, or in purely arbitrary divisions. The only reason for not regarding an anatomical character as a generic definition, is the inconstancy of that character in the different individuals of the same species. The result of not using such an obvious character as the presence of an additional digit on the fore foot, is seen in the author's treatment of the genus *Aceratherium*. Having failed to recognize as genera the steps which separate this genus from *Rhinoceros*, he is now fain to confess that the existence of the intermediate forms "probably indicates that there is really no distinction between *Aceratherium* (in the sense in which it is used here) and *Rhinoceros*; although the retention of the former is convenient." We maintain that the same logic will require the union of *Orthocynodon* and *Amynodon* to this series, and ultimately of *Hyrachyus*, the ancestor of the line. We have long been of the opinion that there is no course open to the systematist, other than the recognition of the structural steps by which the stages of the genealogical lines are marked. (See "Origin of Genera," 1868.)

The doctor justly says that the name *Ursus ursinus* is ridiculous. We wish those who write *Mephitis mephitis*, *Sialia sialis*, etc., could take a similar view. The adoption of generic names

¹ Series x, Vol. II, of Memoirs of the Geological Survey of India; Siwalik and Narbada Carnivora. Vol. II. Siwalik Camelopardalidæ, 1883. Vol. III. Additional Perissodactyla and Proboscidea.

which have been published without definitions finds little favor in this work. It is because the names of Bravard are mostly *nomina nuda*, that they are either neglected or ascribed to the author who took them up and clothed them, which was sometimes kindly done by Professor Gervais. The suspicion of cross affinities between hoofed animals and Carnivora is evidently entertained by Dr. Lydekker (p. 239). He says, "It has lately been shown that there are some remarkable indications of affinity existing between certain extinct suina (*Achænodon*) and the bear-like Carnivora." We hold that such supposed affinity is impossible, and that the only way of tracing the connection between the Artiodactyla and Carnivora is by the way of the Amblypoda and Taxeopoda on the Ungulate side, and of the Creodonts on the Unguiculate side. The real position of *Achænodon* yet remains to be ascertained.

A supposed species of *Hyænodon* is described from the Siwaliks. We venture the prediction that the animal (which is only known from an inferior premolar tooth), will turn out to be a member of a different genus and family, and to belong to the true Carnivora. The existence of an upper Miocene *Hyænodon* must be doubted until fully demonstrated.

Some important additions to this work appear in the appendix as a result of the receipt of the latest publications.

In the memoir on the *Camelopardalidæ* Dr. Lydekker describes seven species from the Upper Tertiaries of India. These belong to six genera; *Camelopardalis*, *Vishnutherium* Lydd., *Helladotherium* Gaud., *Hydasphitherium* Lydd., *Bramatherium* Falc., and *Sivatherium* Caut. and Falc. *Hydasphitherium* only, possesses two species from Indian beds. The *Camelopardalis sivalensis* was about the size of the *C. giraffa*, and of similar proportions. Dr. Lydekker follows the authorities in placing the family next to the Cervidæ. Probably the genus *Cosoryx* is the American and primitive representative of the family. In a foot-note quoting Murie, it is stated that Professor Cope believed that the genus *Megacerops* is allied to the *Sivatherium*. This is an error, for it was Leidy who expressed that opinion at the reference quoted. Cope referred it to the group to which it belongs, the Perissodactyla.—*E. D. Cope*.

GEOLOGICAL NOTES.—*General*.—R. B. Foote (Mem. Geol. Surv. India) in his notes on the geology of the Madura and Tinnevely districts, recognizes the following strata, commencing at the surface: 8. Soils and sub-ærial deposits; 7. Blown sands, red (teris), white (coast dunes); 9. Fluvial and marine alluvia, Kaukas deposits; 5. Sub-recent marine beds, limestones and grits, up-raised coral reefs; 4. Lateritic conglomerates, gravels and sands; 3. Gritty sandstones; 2. Gondwana rocks (Jurassic?); 1. Gneissic rocks. The great hills of red sand in Southeast Tinnevely

form three or four small fresh-water lakes by damming back the drainage.

In another of the memoirs of the same survey, W. T. Blanford describes the hills on the Sind and Punjab frontier. The recognized strata in Sind are the Siwalik (Pliocene and Upper Miocene), the Gaj (Miocene), the Nari, Upper and Lower (Lower Miocene? Oligocene), the Khirthar (Eocene), the Ranikot (Lower Eocene), the Deccan trap (Transition or Laramie) and limestone with hippurites, probably cretaceous. Two *Melantias*, a *Paludina*, and four *Unios* are described.

Palæozoic.—The first part of the fifth volume of the Palæontology of the Geological survey of New York is devoted to the Lamellibranchiata Monomyaria. The new species described are *Aviculopecten æquilateralis*; six species of *Pterinopecten*; *Pterinea grandis* and *interstitialis*, *Vertumnia reprobæ*; eight species of *Actinopteria*; fourteen forms of *Ptychopteria*; six species of *Leioptera*; thirty species of *Leptodesma*, and three of *Mytilarca*. All are from the Upper Helderberg, Hamilton or Chemung groups.—S. A. Miller (Jour. Cin. Soc. Nat. Hist.) describes *Palæaster magnificus*, from the Lower Silurian of the Hudson River group, and *Gomphoceras faberi* and *cincinnatiense* from the same group.—U. P. James (loc. cit.), describes a *Stromatopora*, a *Fistulipora* and a *Cerampora*, from the Cincinnati group.—E. O. Ulrich (Jour. Cin. Soc. Nat. Hist.), describes thirteen species of *Polyzoa* belonging to the genera *Rhombopora*, *Cystodictya*, *Fistulipora*, etc.—Professor P. M. Duncan (Quart. Jour. Geol. Soc.), describes *Streptelasma ræmeri*, a new coral from the Wenlock shale, also *Cyathophyllyllum fletcheri*, from the same formation.—The report of Messrs. R. Etheridge, H. Woodward and R. Jones on the fossil Phyllopora of the Palæozoic rocks, enumerates thirty-three genera, with a short diagnosis of each, and gives a full description of *Hymenocaris*, *Caryocaris* and *Lingulocaris*.—Mr. J. F. Whiteaves (Trans. Roy. Soc. Canada) describes and figures some supposed annelid tracks (*Gyrichnites*), from the Gaspé sandstones.

Silurian.—Ch. Barrois (Ann. Soc. Geol. du Nord 1883), gives notes on the Silurian fauna of Haute-Garonne.

Mesozoic.—M. E. Sauvage (Annales des Sciences Geologiques), describes the fossil reptiles of a bone bed in the Rhetian of the department of Saone-et-Loire. The beds contain also numerous mollusks. The species described are *Rachitrema pellati*; *Aetiosaurus gaudryi*; *Ichthyosaurus rheticus* and *carinatus*, and *Plesiosaurus bilraetensis* and *costatus*, all, save the last, new species. The character of the fauna is intermediate between that of the Lias and Trias and the flora is of the same mixed character.—J. S. Gardner (Quart. Jour. Geol. Soc.), contributes a monograph on the British Cretaceous Nuculidæ.—The report of the Geological and Natural History Survey of Canada has a description by J. F.

Whiteaves of the fossils of the coal-bearing Cretaceous deposits of the Queen Charlotte islands. From the upper shales the only species described is *Inoceramus problematicus*. From the coarse conglomerate below the guard of a belemnite is the only fossil yet obtained, but from the lower shales and sandstones nineteen Cephalopoda and seven Gasteropoda, besides Lamellibranchs, are known. The majority of the species are new.—In the Transactions of the Royal Society of Canada, Mr. Whiteaves describes some fossils from the Lower Cretaceous rocks of British Columbia. Though the equivalents of the Upper Cretaceous of Europe have been recognized over a vast extent of country in North America, the Lower Cretaceous, with the possible exceptions of the Dakota group and the Shasta group, has only been recognized during the last seven years by the researches of Dr. Dawson in British Columbia. It is now believed that the equivalents of each of the sub-divisions of the Middle Cretaceous, as well as of the "Neocomien superieur," Lower Greensand, or upper sub-division of the Lower Cretaceous have now been found there. From this formation Mr. Whiteaves enumerates thirteen species of mollusks, three of which he describes as new.

Jurassic.—J. Wohlgemuth (Soc. des Sciences de Nancy), publishes the results of his researches among the middle Jurassic strata to the east of the Paris basin, including the Bathonian, Callorian, Oxfordian, Corallian and Astartian strata. Both upper and lower Oxfordian are recognized.

Cretaceous.—Professor P. M. Duncan (*Geol. Mag.*, Jan.) clears up the ambiguity that has rested upon *Galerites albogalerus* Lam., which, with Loven, he regards as synonymous with *Echinoconus conicus* Breynius. The species is not a toothed echinid, as it has usually been regarded; it has no auricles; the anus is not entirely infra-marginal; and there is no fifth genital plate in the apical system.

Laramie.—M. Neumayr (Neu. Jahrb. für Min. Geol. und Pal., Stuttgart 1884) notes the parallel position occupied by the Laramie group in Northwest America and the Inter-trappean beds of the Deccan in Hindostan. Both are placed between the Cretaceous and the Eocene, and the resemblance of the fossil fauna is well brought out in the subjoined lists:

NAGPOOR.

Physa prinsepi
 " " var. *elongata*
Acella attenuata
Paludina virapai
Unio carteri
Corbicula ingens.

LARAMIE.

Ph. copei
Ph. disjuncta
Ac. haldemanni
Hydrob. anthonyi
Unio gonionotus
Corb. cleburni

Tertiary.—The Palæontological Hand-book of Dames and Kayser, 1883, contains a description of the fossil mammalia of Punin

Ecuador, with a geological treatise by W. Reiss. The species noted are *Myloodon* (sp), *Equus andium*, *Protauchenia reissii*, new genus and species; *Cervus*, sp., *Cervus chilensis*, *Mastodon andium* and *Machærodus neogæus*. The authors believe in the total extinction of the horse in America and its reintroduction by the Spaniards.—M. P. J. Van Beneden (E.xt. des Bull. de l'Acad. Roy. Belg.), describes some bones of a *Sphargis* found in brick-earth of the upper Oligocene period. He names the species *S. rupeliensis*. Fossil remains of the leathery turtle have to a great extent escaped palæontologists, and these bony dermal plates have been described as belonging to *Ostracion*, and have even been associated with *Zeuglodon* and with *Armadillos*. Four species of fossil *Sphargis* are not known, the others being *S. pseud-ostracion*, *S. psephophorus*, and the Alabama species that was associated with *Zeuglodon*.—The last number of the Quarterly Journal of the Geological Society contains notes on Brocchi's collection of Subappenine shells, by J. G. Jeffreys. Brocchi *Conchologia fossile Subappenina* was published in 1814, and was a remarkable work for a time when palæontology was in its infancy. Many of the errors are here eliminated. Mr. Jeffreys concludes that the deposits in which these shells occur were laid down in seas not exceeding fifty fathoms in depth, and states that not the slightest difference can be detected between any of the fossil species in the Pliocene formation which still survive, and their descendants of the present day.

BOTANY.¹

NOTES ON FUNGI (*Continued from the May number*).—The different species of *Polyporus* vary much in size. The specimen of *Polyporus berkeleyi* Fr., from which the specimens in North American Fungi were taken, was two feet across and weighed fourteen pounds, while *P. cupulæformis* B. & Rav., is only from one-eighth to one-quarter of an inch in diameter, with pores so fine as to be hardly visible without a lens. The external surface is also very variable. In *P. lucidus* the pileus is of a chestnut red color and smooth as if varnished, while in *P. (Trametes) hydnoïdes*, a sub-tropical species, the surface of the pileus is thickly clothed with a coat of black stiff bristle-like hairs. A very curious and unusual form of *Polyporus* is seen in *P. pendulus* B. & C., which grows on the under side or in cavities inside of rotten logs of oak and pine. The pileus is obconic in shape, $\frac{1}{4}$ – $\frac{1}{2}$ an inch across, and is *suspended* by a slender stem about half an inch long. When mature it bears a striking resemblance to the basal portion of a tufted specimen of *Hemiarcyria rubiformis* from which the capillitium and spores have disappeared, and being of a similar color to this little *Myxogaster* it is, at a casual glance, easily mistaken for it. It also bears some resemblance to a small nest of the red

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